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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/672,079	09/29/2003	Ehud Langberg	060707-1560	4738

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EXAMINER	
ODOM, CURTIS B	

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/672,079	LANGBERG ET AL.	
	Examiner	Art Unit	
	CURTIS B. ODOM	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *7/1/2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14,29-42 and 57* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14,29-42 and 57* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 7/1/2008 have been fully considered but they are not persuasive. Applicant states (see page 12 of the Remarks) **"Applicants respectfully submit that neither the *Chu* reference nor the *Ross* reference, individually or in combination, disclose, teach, or suggest the feature emphasized above in claim 1. On page 4, the Office Action alleges that the *Chu* reference discloses this step and cites col. 16, lines 30-43 and col. 10, lines 39-49. Applicants respectfully submit, however, that *Chu* fails to disclose, teach, or suggest *reducing a variance between the input signal and the prediction signal.* With regards to the cited passages, the Office Action asserts that *Chu* discloses *"minimizing an error representinq a variance between the input signal (received data signal) and the prediction signal (equalized symbol decision) by updating the noise coefficients of the noise predictor."* (Emphasis added; Office Action, page 4). The Office Action, however, fails to specify with particularity how *Chu* discloses "reducing a variance between the input signal and the prediction signal," as explicitly recited in claim 1. Applicants respectfully submit that asserting that "error" equates to or represents a variance is conclusory in nature. Applicants note that claim 1 does not recite "reducing an error." Rather, claim 1 explicitly recites "reducing a variance." As such, *Chu* fails to disclose, teach, or suggest this feature. Moreover, the secondary *Ross* reference fails to address this deficiency."**

However, the instant application does not specifically define "variance", thus, the Examiner has given the broadest reasonable interpretation to the word "variance" consistent with the specification. Thus, it is the understanding of the Examiner, that based on the specification, see page 10, lines 1-16, that the variance reduced by a least mean square technique (see claim 13) is defined as a difference between the input signal and the predication signal (see page 10, lines 13-16). Chu et al. (U. S. Patent No. 6, 934, 345) discloses minimizing (reducing) an error (difference) representing a noise variance/variation between the input signal (received data signal) and the prediction signal output from a noise predictor by updating the noise coefficients of the noise predictor to reduce an error signal e1(n) generated from the comparison of the input signal and the predication signal (see column 10, lines 39-49 and column 13, lines 25-59). Therefore, based on the above disclosure, it is the understanding of the Examiner that Chu et al. does is fact disclose reducing a difference (variance) based between an input signal and prediction signal.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 3, 5-9, 13, 14, 29, 31, 33-37, 41, 42, and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al. (previously cited in Office Action 4/1/2008) in view of Ross et al. (previously cited in Office Action 4/1/2008).

Regarding claim 1, Chu et al. discloses a method for reducing correlated noise (see column 4, lines 8-13) due to crosstalk (see column 15, lines 31-37), in an ADSL environment (see column 17, lines 30-44) in the frequency domain, wherein it is the understanding of the examiner crosstalk is due to handshake tones in ADSL (see instant specification page 3, line 23-page 4, line 9) the method comprising the steps of:

receiving (Fig. 7) an input signal (r(n) + n(n)) in the frequency domain having a correlated noise time component (as described in column 1, line 59-column 2, line 11), wherein the receiver reduces correlated noise (see column 2, lines 49-54) in the frequency spectrum (domain), wherein the noise in the frequency domain is described in column 1, line 59-column 2, line 11;

generating a delayed signal (see Fig. 7, block 175) by delaying the input signal by a symbol period (see column 11, lines 53-57);

generating a prediction signal using a noise predictor (Fig. 7, block 160) based at least in part on an error signal (Fig. 7, 216) which is based on the delayed signal (see column 13, lines 38-41);

comparing the input signal and the prediction signal at Fig. 7, element 135; and

reducing an error (difference) representing a noise variance/variation between the input signal (received data signal) and the prediction signal output from a noise predictor by updating the noise coefficients of the noise predictor to reduce an error signal e1(n) generated from the

comparison of the input signal and the predication signal (see column 10, lines 39-49 and column 13, lines 25-59).

Chu et al. does not specifically disclose the input signal has a short correlation time component and a long correlation time component.

However, Ross et al. discloses broadband signals (such as ADSL signals) have short cross-correlation times (see column 3, lines 7-9) and narrowband noises combined with the broadband signals have long correlation times (see Fig. 5B, column 5, lines 11-24). Ross et al. further discloses a delay can be introduced which is greater than the short correlation time of the broadband signals but shorter than the long correlation time of the narrowband noise so that the long correlation noise component can be attenuated (see column 2, lines 36-48, see also column 4, lines 6-11). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the delay of Chu et al. with the delay of Ross et al. in order to attenuate noises with long-correlation times (see Ross et al., column 5, lines 11-15).

Regarding claim 3, Chu et al. further discloses the delay value is a time-symbol value (see column 11, lines 53-57)

Regarding claim 5, Chu et al. discloses the delay value comprises a predetermined time symbol value (see column 11, lines 53-57).

Regarding claims 6 and 7, Chu et al. further discloses the correlated noise (see column 4, lines 8-13) due to crosstalk (FEXT and NEXT), see column 15, lines 31-37, in ADSL (see column 17, lines 30-44) is reduced (wherein ADSL includes handshake tones, see instant specification, page 4, lines 3-7).

Regarding claims 8 and 9, Chu et al. and Ross et al. do not specifically disclose the steps of claim 1 are performed at the CPE or CO. However, ADSL standards include both the CO and CPE apparatuses for initalization (see instant specification, page 2, lines 8-28). Therefore, since Chu et al. discloses performing the steps of claim 1 for an ADSL system (see column 17, lines 30-44), it would have been obvious to perform the steps for both the CO and CPE to reduce correlated noise in data transmission and reception between the CO and CPE (see Chu et al., column 4, lines 8-12).

Regarding claim 13, Chu et al. further discloses reducing an error representing a noise variance between the input signal (received data signal) and the prediction signal by updating the noise coefficients using a least mean square error (see column 10, lines 41-49).

Regarding claim 14, Chu et al. discloses the input signal contains correlated noise or a correlated disturbance (noise) signal from a source such as crosstalk (see column 15, lines 31-38).

Regarding claim 29, Chu et al. discloses a system (see Fig.7), for reducing correlated noise (see column 4, lines 8-13) due to crosstalk (see column 15, lines 31-37), in an ADSL environment (see column 17, lines 30-44) in the frequency domain, wherein it is the understanding of the examiner crosstalk is due to handshake tones in ADSL (see instant specification page 3, line 23-page 4, line 9) the system comprising:

an input for receiving (input to Fig. 7) an input signal (r(n) + n(n)) in the frequency domain having a correlated noise time component (as described in column 1, line 59-column 2, line 11), wherein the receiver reduces correlated noise (see column 2, lines 49-54) in the

frequency spectrum (domain), wherein the noise in the frequency domain is described in column 1, line 59-column 2, line 11;

a delay module for generating a delayed signal (see Fig. 7, block 175) by delaying the input signal by a symbol period (see column 11, lines 53-57);

a noise predictor (Fig. 7, block 160) for generating a prediction signal based at least in part on an error signal (Fig. 7, 216) which is based on the delayed signal (see column 13, lines 38-41), wherein the input signal and the prediction signal are compared at Fig. 7, element 135; and reducing), and an error (difference) representing a noise variance/variation between the input signal (received data signal) and the prediction signal output from a noise predictor is reduced by updating the noise coefficients of the noise predictor to reduce an error signal e1(n) generated from the comparison of the input signal and the predication signal (see column 10, lines 39-49 and column 13, lines 25-59). Chu et al. does not specifically disclose the input signal has a short correlation time component and a long correlation time component.

However, Ross et al. discloses broadband signals (such as ADSL signals) have short cross-correlation times (see column 3, lines 7-9) and narrowband noises combined with the broadband signals have long correlation times (see Fig. 5B, column 5, lines 11-24). Ross et al. further discloses a delay can be introduced which is greater than the short correlation time of the broadband signals but shorter than the long correlation time of the narrowband noise so that the long correlation noise component can be attenuated (see column 2, lines 36-48, see also column 4, lines 6-11). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the delay of Chu et al. with the delay of Ross et al. in order to attenuate noises with long-correlation times (see Ross et al., column 5, lines 11-15).

Regarding claim 31, Chu et al. further discloses the delay value is a time-symbol value (see column 11, lines 53-57)

Regarding claim 33, Chu et al. discloses the delay value comprises a predetermined time symbol value (see column 11, lines 53-57).

Regarding claims 34 and 35, Chu et al. further discloses the correlated noise (see column 4, lines 8-13) due to crosstalk (FEXT and NEXT), see column 15, lines 31-37, in ADSL (see column 17, lines 30-44) is reduced (wherein ADSL includes handshake tones, see instant specification, page 4, lines 3-7).

Regarding claims 36 and 37, Chu et al. and Ross et al. do not specifically disclose the system of claim 29 resides at the CPE or CO. However, ADSL standards include both CO and CPE apparatuses for initialization. Therefore, since Chu et al. discloses the system of claim 29 for an ADSL system (see column 17, lines 30-44), it would have been obvious to incorporate the system in both the CO and CPE to reduce correlated noise in data transmission and reception between the CO and CPE (see Chu et al., column 4, lines 8-12).

Regarding claim 41, Chu et al. further discloses reducing an error representing a variance between the input signal (received data signal) and the prediction signal by updating the noise coefficients using a least mean square error (see column 10, lines 41-49).

Regarding claim 42, Chu et al. discloses the input signal contains correlated noise or a correlated disturbance (noise) signal from a source such as crosstalk (see column 15, lines 31-38).

Regarding claim 57, the claim includes limitations corresponding to the above rejection of claim 29, which is applicable hereto.

4. Claims 2, 4, 30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al. (previously cited in Office Action 4/1/2008) in view of Ross et al. (previously cited in Office Action 4/1/2008) as applied to claims 1 and 29, and in further view Lai (previously cited in Office Action 4/1/2008).

Regarding claims 2, 4, 30, and 32, Chu et al. discloses the corrupted signal can be a frequency domain ADSL signal (see column 17, lines 30-44) at a predetermined symbol time (see Fig. 7, wherein n(n) represents the correlated symbol noise). Chu et al. further discloses the delay value is one symbol unit (column 11, lines 53-57). Chu et al. and Ross et al. do not specifically disclose the predetermined symbol contains a predetermined bin or one symbol represents 512 time domain samples.

However, Lai discloses in ADSL, each symbol comprises 512 samples with 256 tones (bins), see column 1, lines 56-60). Thus, it is the understanding of the Examiner the corrupted symbols contain corrupted bins. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the ADSL of Chu et al. and Ross et al. with the ADSL of Lai since Lai states ADSL provides for high speed data communication over telephone networks (see column 1, lines 7-10).

5. Claims 10-12 and 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al. (previously cited in Office Action 4/1/2008) in view of Ross et al. (previously cited in Office Action 4/1/2008) as applied to claims 1 and 14, and in further view of Bergmans (previously cited in Office Action 4/1/2008).

Regarding claims 10-12 and 38-40, Chu et al. and Ross et al. do not disclose the noise predictor is a causal filter which uses historical data or one past disturbance to generate the prediction signal.

However, Bergmans discloses a causal filter (see Fig. 2B, feedback (FB) filter) which provides a signal (prediction) used to cancel interference in an input signal (see column 5, lines 4-20), wherein the signal output from the filter is determined by past symbol decisions (see column 5, lines 12-20). Bergmans further discloses the filter has a causal impulse response which includes prior (history) knowledge of the transfer characteristic (noise) of the transmission channel (see column 9, lines 35-47). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the noise predictor of Chu et al. and Ross et al. with the causal filter of Bergmans to cancel inter-symbol interference using the past signal data (see column 4, lines 44-53).

Conclusion

6. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CURTIS B. ODOM whose telephone number is (571)272-3046. The examiner can normally be reached on Monday- Friday, 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Curtis B. Odom/
Primary Examiner, Art Unit 2611
October 12, 2008

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
	10/672,079	LANGBERG ET AL.	
	Examiner	Art Unit	
	CURTIS B. ODOM	2611	